

SEQUENCE LISTING

<110> Ballance, David J.
Sleep, Darrell
Turner, Andrew J.
Sadeghi, Homa
Prior, Christopher P.

<120> Albumin Fusion Proteins

<130> PF542

<140> Unassigned

<141> 2001-04-12

<150> 60/229,358

<151> 2000-04-12

<150> 60/256,931

<151> 2000-12-21

<150> 60/199,384

<151> 2000-04-25

<160> 37

<170> PatentIn Ver. 2.1

<210> 1

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<221> primer_bind

<223> primer useful to clone human growth hormone cDNA

<400> 1

cccaagaatt cccttatcca ggc

23

<210> 2

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<221> primer_bind

<223> primer useful to clone human growth hormone cDNA

<400> 2

gggaagctta gaagccacag gatccctcca cag

33

<210> 3

<211> 16

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_structure
<223> synthetic oligonucleotide used to join DNA fragments
with non-cohesive ends.

<400> 3
gataaagatt cccaac

16

<210> 4
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<221> misc_structure
<223> synthetic oligonucleotide used to join DNA fragments
with non-cohesive ends.

<400> 4
aattggtggg aatcttt

17

<210> 5
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<221> misc_structure
<223> synthetic oligonucleotide used to join DNA fragments
with non-cohesive ends.

<400> 5
ttaggcttat tcccaac

17

<210> 6
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<221> misc_structure
<223> synthetic oligonucleotide used to join DNA fragments
with non-cohesive ends.

<400> 6
aattggtggg aataagcc

18

<210> 7
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<221> SITE
<222> 1)..(19)
<223> invertase leader sequence

<220>
 <221> SITE
 <222> 20)..(24)
 <223> first 5 amino acids of mature human serum albumin

 <400> 7
 Met Leu Leu Gln Ala Phe Leu Phe Leu Leu Ala Gly Phe Ala Ala Lys
 1 5 10 15

 Ile Ser Ala Asp Ala His Lys Ser
 20

<210> 8
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <221> misc_structure
 <223> synthetic oligonucleotide used to join DNA
 fragments with non-cohesive ends.

<400> 8
 gagatgcaca cctgagtgag g 21

<210> 9
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <221> misc_structure
 <223> synthetic oligonucleotide used to join DNA
 fragments with non-cohesive ends.

<400> 9
 gatcctgtgg cttcgatgca cacaaga 27

<210> 10
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <221> misc_structure
 <223> synthetic oligonucleotide used to join DNA
 fragments with non-cohesive ends.

<400> 10
 ctcttggtg catcgaagcc acag 24

<210> 11
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <221> misc_structure
 <223> synthetic oligonucleotide used to join DNA
 fragments with non-cohesive ends.

 <400> 11
 tgtggaagag cctcagaatt tattcccaac 30

 <210> 12
 <211> 31
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> misc_structure
 <223> synthetic oligonucleotide used to join DNA
 fragments with non-cohesive ends.

 <400> 12
 aattgttggg aataaattct gaggtctcttc c 31

 <210> 13
 <211> 47
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> misc_structure
 <223> synthetic oligonucleotide used to join DNA
 fragments with non-cohesive ends.

 <400> 13
 ttaggcttag gtggcggtgg atccggcggt ggtggatctt tcccaac 47

 <210> 14
 <211> 48
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> misc_structure
 <223> synthetic oligonucleotide used to join DNA
 fragments with non-cohesive ends.

 <400> 14
 aattgttggg aaagatccac caccgccgga tccaccgccca cctaagcc 48

 <210> 15
 <211> 62
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> misc_structure
 <223> synthetic oligonucleotide used to join DNA
 fragments with non-cohesive ends.

<400> 15
 ttaggcttag gcggtggtgg atctggtggc ggcggatctg gtggcggtgg atccttccca 60
 ac 62

<210> 16
 <211> 63
 <212> DNA
 <213> Artificial Sequence

<220>
 <221> misc_structure
 <223> synthetic oligonucleotide used to join DNA
 fragments with non-cohesive ends.

<400> 16
 aattgttggg aaggatccac cgccaccaga tccgccgcca ccagatccac caccgcctaa 60
 gcc 63

<210> 17
 <211> 1782
 <212> DNA
 <213> Homo sapiens

<220>
 <221> CDS
 <222> (1)..(1755)

<400> 17
 gat gca cac aag agt gag gtt gct cat cgg ttt aaa gat ttg gga gaa 48
 Asp Ala His Lys Ser Glu Val Ala His Arg Phe Lys Asp Leu Gly Glu
 1 5 10 15
 gaa aat ttc aaa gcc ttg gtg ttg att gcc ttt gct cag tat ctt cag 96
 Glu Asn Phe Lys Ala Leu Val Leu Ile Ala Phe Ala Gln Tyr Leu Gln
 20 25 30
 cag tgt cca ttt gaa gat cat gta aaa tta gtg aat gaa gta act gaa 144
 Gln Cys Pro Phe Glu Asp His Val Lys Leu Val Asn Glu Val Thr Glu
 35 40 45
 ttt gca aaa aca tgt gtt gct gat gag tca gct gaa aat tgt gac aaa 192
 Phe Ala Lys Thr Cys Val Ala Asp Glu Ser Ala Glu Asn Cys Asp Lys
 50 55 60
 tca ctt cat acc ctt ttt gga gac aaa tta tgc aca gtt gca act ctt 240
 Ser Leu His Thr Leu Phe Gly Asp Lys Leu Cys Thr Val Ala Thr Leu
 65 70 75 80
 cgt gaa acc tat ggt gaa atg gct gac tgc tgt gca aaa caa gaa cct 288
 Arg Glu Thr Tyr Gly Glu Met Ala Asp Cys Cys Ala Lys Gln Glu Pro
 85 90 95
 gag aga aat gaa tgc ttc ttg caa cac aaa gat gac aac cca aac ctc 336
 Glu Arg Asn Glu Cys Phe Leu Gln His Lys Asp Asp Asn Pro Asn Leu
 100 105 110

| | |
|---|------|
| ccc cga ttg gtg aga cca gag gtt gat gtg atg tgc act gct ttt cat | 384 |
| Pro Arg Leu Val Arg Pro Glu Val Asp Val Met Cys Thr Ala Phe His | |
| 115 120 125 | |
| gac aat gaa gag aca ttt ttg aaa aaa tac tta tat gaa att gcc aga | 432 |
| Asp Asn Glu Glu Thr Phe Leu Lys Lys Tyr Leu Tyr Glu Ile Ala Arg | |
| 130 135 140 | |
| aga cat cct tac ttt tat gcc ccg gaa ctc ctt ttc ttt gct aaa agg | 480 |
| Arg His Pro Tyr Phe Tyr Ala Pro Glu Leu Leu Phe Phe Ala Lys Arg | |
| 145 150 155 160 | |
| tat aaa gct gct ttt aca gaa tgt tgc caa gct gct gat aaa gct gcc | 528 |
| Tyr Lys Ala Ala Phe Thr Glu Cys Cys Gln Ala Ala Asp Lys Ala Ala | |
| 165 170 175 | |
| tgc ctg ttg cca aag ctc gat gaa ctt cgg gat gaa ggg aag gct tcg | 576 |
| Cys Leu Leu Pro Lys Leu Asp Glu Leu Arg Asp Glu Gly Lys Ala Ser | |
| 180 185 190 | |
| tct gcc aaa cag aga ctc aaa tgt gcc agt ctc caa aaa ttt gga gaa | 624 |
| Ser Ala Lys Gln Arg Leu Lys Cys Ala Ser Leu Gln Lys Phe Gly Glu | |
| 195 200 205 | |
| aga gct ttc aaa gca tgg gca gtg gct cgc ctg agc cag aga ttt ccc | 672 |
| Arg Ala Phe Lys Ala Trp Ala Val Ala Arg Leu Ser Gln Arg Phe Pro | |
| 210 215 220 | |
| aaa gct gag ttt gca gaa gtt tcc aag tta gtg aca gat ctt acc aaa | 720 |
| Lys Ala Glu Phe Ala Glu Val Ser Lys Leu Val Thr Asp Leu Thr Lys | |
| 225 230 235 240 | |
| gtc cac acg gaa tgc tgc cat gga gat ctg ctt gaa tgt gct gat gac | 768 |
| Val His Thr Glu Cys Cys His Gly Asp Leu Leu Glu Cys Ala Asp Asp | |
| 245 250 255 | |
| agg gcg gac ctt gcc aag tat atc tgt gaa aat cag gat tcg atc tcc | 816 |
| Arg Ala Asp Leu Ala Lys Tyr Ile Cys Glu Asn Gln Asp Ser Ile Ser | |
| 260 265 270 | |
| agt aaa ctg aag gaa tgc tgt gaa aaa cct ctg ttg gaa aaa tcc cac | 864 |
| Ser Lys Leu Lys Glu Cys Cys Glu Lys Pro Leu Leu Glu Lys Ser His | |
| 275 280 285 | |
| tgc att gcc gaa gtg gaa aat gat gag atg cct gct gac ttg cct tca | 912 |
| Cys Ile Ala Glu Val Glu Asn Asp Glu Met Pro Ala Asp Leu Pro Ser | |
| 290 295 300 | |
| tta gct gct gat ttt gtt gaa agt aag gat gtt tgc aaa aac tat gct | 960 |
| Leu Ala Ala Asp Phe Val Glu Ser Lys Asp Val Cys Lys Asn Tyr Ala | |
| 305 310 315 320 | |
| gag gca aag gat gtc ttc ctg ggc atg ttt ttg tat gaa tat gca aga | 1008 |
| Glu Ala Lys Asp Val Phe Leu Gly Met Phe Leu Tyr Glu Tyr Ala Arg | |
| 325 330 335 | |
| agg cat cct gat tac tct gtc gtg ctg ctg ctg aga ctt gcc aag aca | 1056 |
| Arg His Pro Asp Tyr Ser Val Val Leu Leu Leu Arg Leu Ala Lys Thr | |
| 340 345 350 | |

| | |
|--|------|
| tat gaa acc act cta gag aag tgc tgt gcc gct gca gat cct cat gaa | 1104 |
| Tyr Glu Thr Thr Leu Glu Lys Cys Cys Ala Ala Ala Asp Pro His Glu | |
| 355 360 365 | |
| tgc tat gcc aaa gtg ttc gat gaa ttt aaa cct ctt gtg gaa gag cct | 1152 |
| Cys Tyr Ala Lys Val Phe Asp Glu Phe Lys Pro Leu Val Glu Glu Pro | |
| 370 375 380 | |
| cag aat tta atc aaa caa aac tgt gag ctt ttt gag cag ctt gga gag | 1200 |
| Gln Asn Leu Ile Lys Gln Asn Cys Glu Leu Phe Glu Gln Leu Gly Glu | |
| 385 390 395 400 | |
| tac aaa ttc cag aat gcg cta tta gtt cgt tac acc aag aaa gta ccc | 1248 |
| Tyr Lys Phe Gln Asn Ala Leu Leu Val Arg Tyr Thr Lys Lys Val Pro | |
| 405 410 415 | |
| caa gtg tca act cca act ctt gta gag gtc tca aga aac cta gga aaa | 1296 |
| Gln Val Ser Thr Pro Thr Leu Val Glu Val Ser Arg Asn Leu Gly Lys | |
| 420 425 430 | |
| gtg ggc agc aaa tgt tgt aaa cat cct gaa gca aaa aga atg ccc tgt | 1344 |
| Val Gly Ser Lys Cys Cys Lys His Pro Glu Ala Lys Arg Met Pro Cys | |
| 435 440 445 | |
| gca gaa gac tat cta tcc gtg gtc ctg aac cag tta tgt gtg ttg cat | 1392 |
| Ala Glu Asp Tyr Leu Ser Val Val Leu Asn Gln Leu Cys Val Leu His | |
| 450 455 460 | |
| gag aaa acg cca gta agt gac aga gtc aca aaa tgc tgc aca gag tcc | 1440 |
| Glu Lys Thr Pro Val Ser Asp Arg Val Thr Lys Cys Cys Thr Glu Ser | |
| 465 470 475 480 | |
| ttg gtg aac agg cga cca tgc ttt tca gct ctg gaa gtc gat gaa aca | 1488 |
| Leu Val Asn Arg Arg Pro Cys Phe Ser Ala Leu Glu Val Asp Glu Thr | |
| 485 490 495 | |
| tac gtt ccc aaa gag ttt aat gct gaa aca ttc acc ttc cat gca gat | 1536 |
| Tyr Val Pro Lys Glu Phe Asn Ala Glu Thr Phe Thr Phe His Ala Asp | |
| 500 505 510 | |
| ata tgc aca ctt tct gag aag gag aga caa atc aag aaa caa act gca | 1584 |
| Ile Cys Thr Leu Ser Glu Lys Glu Arg Gln Ile Lys Lys Gln Thr Ala | |
| 515 520 525 | |
| ctt gtt gag ctt gtg aaa cac aag ccc aag gca aca aaa gag caa ctg | 1632 |
| Leu Val Glu Leu Val Lys His Lys Pro Lys Ala Thr Lys Glu Gln Leu | |
| 530 535 540 | |
| aaa gct gtt atg gat gat ttc gca gct ttt gta gag aag tgc tgc aag | 1680 |
| Lys Ala Val Met Asp Asp Phe Ala Ala Phe Val Glu Lys Cys Cys Lys | |
| 545 550 555 560 | |
| gct gac gat aag gag acc tgc ttt gcc gag gag ggt aaa aaa ctt gtt | 1728 |
| Ala Asp Asp Lys Glu Thr Cys Phe Ala Glu Glu Gly Lys Lys Leu Val | |
| 565 570 575 | |
| gct gca agt caa gct gcc tta ggc tta taacatctac atttaaaaagc atctcag | 1782 |
| Ala Ala Ser Gln Ala Ala Leu Gly Leu | |
| 580 585 | |

Cys Ile Ala Glu Val Glu Asn Asp Glu Met Pro Ala Asp Leu Pro Ser
 290 295 300
 Leu Ala Ala Asp Phe Val Glu Ser Lys Asp Val Cys Lys Asn Tyr Ala
 305 310 315 320
 Glu Ala Lys Asp Val Phe Leu Gly Met Phe Leu Tyr Glu Tyr Ala Arg
 325 330 335
 Arg His Pro Asp Tyr Ser Val Val Leu Leu Leu Arg Leu Ala Lys Thr
 340 345 350
 Tyr Glu Thr Thr Leu Glu Lys Cys Cys Ala Ala Ala Asp Pro His Glu
 355 360 365
 Cys Tyr Ala Lys Val Phe Asp Glu Phe Lys Pro Leu Val Glu Glu Pro
 370 375 380
 Gln Asn Leu Ile Lys Gln Asn Cys Glu Leu Phe Glu Gln Leu Gly Glu
 385 390 395 400
 Tyr Lys Phe Gln Asn Ala Leu Leu Val Arg Tyr Thr Lys Lys Val Pro
 405 410 415
 Gln Val Ser Thr Pro Thr Leu Val Glu Val Ser Arg Asn Leu Gly Lys
 420 425 430
 Val Gly Ser Lys Cys Cys Lys His Pro Glu Ala Lys Arg Met Pro Cys
 435 440 445
 Ala Glu Asp Tyr Leu Ser Val Val Leu Asn Gln Leu Cys Val Leu His
 450 455 460
 Glu Lys Thr Pro Val Ser Asp Arg Val Thr Lys Cys Cys Thr Glu Ser
 465 470 475 480
 Leu Val Asn Arg Arg Pro Cys Phe Ser Ala Leu Glu Val Asp Glu Thr
 485 490 495
 Tyr Val Pro Lys Glu Phe Asn Ala Glu Thr Phe Thr Phe His Ala Asp
 500 505 510
 Ile Cys Thr Leu Ser Glu Lys Glu Arg Gln Ile Lys Lys Gln Thr Ala
 515 520 525
 Leu Val Glu Leu Val Lys His Lys Pro Lys Ala Thr Lys Glu Gln Leu
 530 535 540
 Lys Ala Val Met Asp Asp Phe Ala Ala Phe Val Glu Lys Cys Cys Lys
 545 550 555 560
 Ala Asp Asp Lys Glu Thr Cys Phe Ala Glu Glu Gly Lys Lys Leu Val
 565 570 575
 Ala Ala Ser Gln Ala Ala Leu Gly Leu
 580 585

<210> 19
 <211> 5'
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> primer_bind
 <223> primer used to generate XhoI and ClaI
 site in pPPC0006

 <400> 19
 gectcgagaa aagagatgca cacaagagtg aggttgctca tcgatttaaa gatttgg 57

 <210> 20
 <211> 58
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> primer_bind
 <223> primer used in generation XhoI and ClaI
 site in pPPC0006

 <400> 20
 aatcgatgag caacctcact cttgtgtgca tctcttttct cgaggctcct ggaataag 58

 <210> 21
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> primer_bind
 <223> primer used in generation XhoI and ClaI
 site in pPPC0006

 <400> 21
 tacaaactta agagtccaat tagc 24

 <210> 22
 <211> 29
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> primer_bind
 <223> primer used in generation XhoI and ClaI
 site in pPPC0006

 <400> 22
 cacttcctca gagtggtttc atatgtctt 29

 <210> 23
 <211> 60
 <212> DNA
 <213> Artificial Sequence

<220>
 <221> Misc_Structure
 <223> Synthetic oligonucleotide used to alter restriction
 sites in pPPC0007

 <400> 23
 aagctgcctt aggcttataa taaggcgcgc cggccggccg tttaaactaa gcttaattct 60

 <210> 24
 <211> 60
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> Misc_Structure
 <223> Synthetic oligonucleotide used to alter restriction
 sites in pPPC0007

 <400> 24
 agaattaagc ttagtttaaa cggccggccg gcgcgcctta ttataagcct aaggcagctt 60

 <210> 25
 <211> 32
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> primer_bind
 <223> forward primer useful for generation of albumin
 fusion protein in which the albumin moiety is N-terminal
 of the Therapeutic Protein

 <220>
 <221> misc_feature
 <222> (18)
 <223> n equals a,t,g, or c

 <220>
 <221> misc_feature
 <222> (19)
 <223> n equals a,t,g, or c

 <220>
 <221> misc_feature
 <222> (20)
 <223> n equals a,t,g, or c

 <220>
 <221> misc_feature
 <222> (21)
 <223> n equals a,t,g, or c

 <220>
 <221> misc_feature
 <222> (22)
 <223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (23)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (25)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (27)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (28)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (29)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (30)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (32)
<223> n equals a,t,g, or c

<400> 25
aagctgcctt aggcttannn nnnnnnnnnn nn

32

<210> 26
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<221> primer_bind

<223> reverse primer useful for generation of albumin fusion protein in which the albumin moiety is N-terminal of the Therapeutic Protein

<220>
<221> misc_feature
<222> (37)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (38)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (39)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (41)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (43)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (44)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (45)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (46)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (47)
<223> n equals a,t,g, or c

<220>

<221> misc_feature
<222> (48)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (49)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (50)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (51)
<223> n equals a,t,g, or c

<400> 26
gcgcgcgttt aaacggccgg ccggcgcgcc ttattannnn nnnnnnnnnn n

51

<210> 27
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> forward primer useful for generation of albumin fusion protein in which the albumin moiety is c-terminal of the Therapeutic Protein

<220>
<221> misc_feature
<222> (19)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (20)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (21)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (22)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (23)
<223> n equals a,t,g, or c

<220>
<221> misc_feature

```

222> (24)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (25)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (26)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (27)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (28)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (29)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (30)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (31)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
222> (32)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (33)
<223> n equals a,t,g, or c

<400> 27
aggagcgctcg acaaaagann nnnnnnnnnn nnn

```

33

```

<210> 28
<211> 52
<212> DNA
<213> Artificial Sequence

<220>
<221> primer_bind
<223> reverse primer useful for generation of albumin

```

fusion protein in which the albumin moiety is c-terminal of the Therapeutic Protein

<220>
<221> misc_feature
<222> (38)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (39)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (41)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (43)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (44)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (45)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (46)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (47)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (48)
<223> n equals a,t,g, or c

<220>
<221> misc_feature

<202> (49)
<203> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (50)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (51)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (52)
<223> n equals a,t,g, or c

<400> 28
ctttaaatcg atgagcaacc tcaactcttgt gtgcacnncnnnnnnnnnn nn

52

<210> 29
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<221> signal
<223> signal peptide of natural human serum albumin protein

<400> 29
Met Lys Trp Val Ser Phe Ile Ser Leu Leu Phe Leu Phe Ser Ser Ala
1 5 10 15

Tyr Ser Arg Ser Leu Asp Lys Arg
20

<210> 30
<211> 114
<212> DNA
<213> Artificial Sequence

<220>
<221> primer_bind
<223> forward primer useful for generation of PC4:HSA
albumin fusion VECTOR

<220>
<221> misc_feature
<222> (5)..(10)
<223> BamHI restriction site

<220>
<221> misc_feature
<222> (11)..(16)
<223> Hind III restriction site

<220>
<221> misc_feature

<222> (17)..(27)
 <223> Kozak sequence

 <220>
 <221> misc_feature
 <222> (25)..(97)
 <223> cds natural signal sequence of human serum albumin

 <220>
 <221> misc_feature
 <222> (75)..(81)
 <223> XhoI restriction site

 <220>
 <221> misc_feature
 <222> (98)..(114)
 <223> cds first six amino acids of human serum albumin

 <400> 30
 tcagggatcc aagcttcgc caccatgaag tgggtaacct ttatttcct tctttttctc 60

 tttagctcgg ctactcgag ggggtgtgtt cgtcgagatg cacacaagag tgag 114

 <210> 31
 <211> 43
 <212> DNA
 <213> Artificial Sequence

 <220>
 <221> primer_bind
 <223> reverse primer useful for generation of
 PC4:HSA albumin fusion VECTOR

 <220>
 <221> misc_feature
 <222> (6)..(11)
 <223> Asp718 restriction site

 <220>
 <221> misc_feature
 <222> (12)..(17)
 <223> EcoRI restriction site

 <220>
 <221> misc_feature
 <222> (15)..(17)
 <223> reverse complement of stop codon

 <220>
 <221> misc_feature
 <222> (18)..(25)
 <223> AscI restriction site

 <220>
 <221> misc_feature
 <222> (18)..(43)
 <223> reverse complement of DNA sequence encoding last 9 amino acids

 <400> 31

gcagcggtac cgaattcggc ggcgccttata agcctaaggc agc

43

<210> 32

<211> 46

<212> DNA

<213> Artificial Sequence

<220>

<221> primer_bind

<223> forward primer useful for inserting Therapeutic protein into pC4:HSA vector

<220>

<221> misc_feature

<222> (29)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (30)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (31)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (32)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (33)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (34)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (35)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (36)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (37)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (38)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (39)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (40)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (41)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (42)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (43)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (44)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (45)

<223> n equals a,t,g, or c

<220>

<221> misc_feature

<222> (46)

<223> n equals a,t,g, or c

<400> 32

ccgccgctcg aggggtgtgt ttcgtcgann nnnnnnnnnn nnnnnn

46

<210> 33

<211> 55

<212> DNA

<213> Artificial Sequence

<220>

<221> primer_bind

<223> reverse primer useful for inserting Therapeutic protein into pC4:HSA vector

<220>

<221> misc_feature

<222> (38)

<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (39)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (40)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (41)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (42)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (43)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (44)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (45)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (46)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (47)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (48)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (49)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (50)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (51)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (52)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (53)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (54)
<223> n equals a,t,g, or c

<220>
<221> misc_feature
<222> (55)
<223> n equals a,t,g, or c

<400> 33
agtcccatcg atgagcaacc tcactcttgt gtgcacnnnn nnnnnnnnnnn nnnnn 55

<210> 34
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<221> signal
<223> Stanniocalcin signal peptide

<400> 34
Met Leu Gln Asn Ser Ala Val Leu Leu Leu Val Ile Ser Ala Ser
1 5 10 15

Ala

<210> 35
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<221> signal
<223> Synthetic signal peptide

<400> 35
Met Pro Thr Trp Ala Trp Trp Leu Phe Leu Val Leu Leu Ala Leu
1 5 10 15

Trp Ala Pro Ala Arg Gly
20

<210> 36

<211> 66
 <212> PRT
 <213> Agkistrodon piscivorus

<400> 36
 Ile Thr Tyr Thr Asp Cys Thr Glu Ser Gly Gln Asn Leu Cys Leu Cys
 1 5 10 15
 Glu Gly Ser Asn Val Cys Gly Lys Gly Asn Lys Cys Ile Leu Gly Ser
 20 25 30
 Gln Gly Lys Asp Asn Gln Cys Val Thr Gly Glu Gly Thr Pro Lys Pro
 35 40 45
 Gln Ser His Asn Gln Gly Asp Phe Glu Pro Ile Pro Glu Asp Ala Tyr
 50 55 60
 Asp Glu
 65

<210> 37
 <211> 71
 <212> PRT
 <213> Agkistrodon piscivorus

<400> 37
 Glu Ala Gly Glu Glu Cys Asp Cys Gly Ser Pro Glu Asn Pro Cys Cys
 1 5 10 15
 Asp Ala Ala Thr Cys Lys Leu Arg Pro Gly Ala Gln Cys Ala Glu Gly
 20 25 30
 Leu Cys Cys Asp Gln Cys Lys Phe Met Lys Glu Gly Thr Val Cys Arg
 35 40 45
 Ala Arg Gly Asp Asp Val Asn Asp Tyr Cys Asn Gly Ile Ser Ala Gly
 50 55 60
 Cys Pro Arg Asn Pro Phe His
 65 70